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IS 7908 (1997): Sulphur Dioxide, Food Grade [FAD 8: Food Additives]



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IS 7908 : 1997

भारतीय मानक

सल्फर डाइऑक्साइड, खाद्य ग्रेड — विशिष्ट

(पहला पुनरीक्षण)

Indian Standard

**SULPHUR DIOXIDE, FOOD GRADE —
SPECIFICATION**

(First Revision)

ICS 67.220.20; 71.060.20

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

September 1997

Price Group 2

**AMENDMENT NO. 1 FEBRUARY 2006
TO
IS 7908 : 1997 SULPHUR DIOXIDE, FOOD GRADE —
SPECIFICATION**

(First Revision)

[Page 1, Table 1, Sl No (i), col 3] — Substitute '99.9' for '95'.

[Page 1, Table 1, Sl No (iv), col 3] — Substitute '5' for '10'.

(FAD 8)

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Food Additives Sectional Committee had been approved by the Food and Agriculture Division Council.

With the increased production of processed foods, manufacturers have started adding a large number of substances, generally in small quantities, to improve the appearance, flavour, texture or storage properties, etc, of the processed foods. As certain impurities in these substances have been found to be harmful, it is necessary to have a strict quality control of these food additives. A series of standards was, therefore, prepared to cover purity and identification of these substances. These standards would help in checking purity, which requires to be checked at the stage of manufacture, for it is extremely difficult to detect the impurity once these substances have been added to the processed foods. Besides, these standards are intended to guide the indigenous manufacturers in making their product conform to specifications that are accepted by scientists, health authorities and international bodies.

Use of sulphur dioxide, food grade is permitted under the *Prevention of Food Adulteration Rules*, 1955. These rules, *inter-alia* prescribe:

'The listed food additives permitted for use in certain foods shall be sold only under the BIS Certification Mark.' Sulphur dioxide, food grade is one among the listed additives

Chemical Name — Sulphur dioxide, sulphurous acid anhydride. Its empirical formula is SO_2 . Its molecular weight is 64.007.

This standard was first published in 1975 and is being revised to incorporate the following additions/changes:

- a) to provide a separate clause for description including the solubility property to keep it in line with Food Chemical Codex NRC,
- b) to upgrade the standard by providing limits for heavy metals and moisture and their corresponding test methods, and
- c) to decrease the limit for selenium.

In preparation of this standard, considerable assistance has been derived from the following publications:

Compendium of Food Additive Specifications, Volume 2, Joint FAO/WHO Expert Committee on Food Additives (JECFA), 1992.

Food Chemical Codex (FCC), Third Edition, 1981, National Academy of Science, National Research Council, Washington D.C., USA.

This standard is in line with FAO/WHO specifications. However, this standard does not cover the requirements of liquid sulphur dioxide used in chemical industries for which a separate standard, IS 2432:1993 'Liquid sulphur dioxide (first revision)' has been formulated.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SULPHUR DIOXIDE, FOOD GRADE — SPECIFICATION

(First Revision)

1 SCOPE

1.1 This standard prescribes the requirements and methods of sampling and test for sulphur dioxide, food grade.

2 REFERENCES

The following Indian Standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	Title
1070 : 1992	Reagent grade water (<i>third revision</i>)
1699 : 1995	Methods of sampling and test for synthetic food colours (<i>second revision</i>)
2432 : 1993	Liquid sulphur dioxide (<i>first revision</i>)

3 DESCRIPTION

Sulphur dioxide shall be a colourless, nonflammable gas, with a strong, pungent suffocating odour. 36 volumes shall be soluble in 1 volume of water and 114 volumes shall be soluble in 1 volume of ethanol.

NOTE — The solubility is intended only as information regarding approximate solubility and is not to be considered as a quality requirement and is of minor significance as a means of identification or determination of purity, and dependence must be placed on other specifications.

4 REQUIREMENTS

4.1 Sulphur dioxide shall blacken filter paper moistened with mercurous nitrate.

4.2 Potassium iodate with starch on filter paper shall give a blue colour when exposed to sulphur dioxide. The blue colour shall fade on continued exposure.

4.3 Filter paper moistened with acidified potassium dichromate shall give a green colour when exposed to sulphur dioxide.

4.4 The material shall conform to the requirements given in Table 1.

Table 1 Requirements for Sulphur Dioxide, Food Grade

Sl No.	Characteristic	Limit	Method of Test. Ref to	
			Annex of This Standard	Other Standard
(1)	(2)	(3)	(4)	(5)
i)	Purity (as SO ₂), percent by mass, on dry basis, <i>Min</i>	95	A-1	—
ii)	Non-volatile residue	To conform to test	A-2	—
iii)	Selenium, mg/kg, <i>Max</i>	20	A-3	—
iv)	Lead (Pb), mg/kg, <i>Max</i>	10	A-4	—
v)	Arsenic (as As), mg/kg, <i>Max</i>	3	A-5	—
vi)	Heavy metals, mg/kg, <i>Max</i>	30	A-6	—
vii)	Moisture, percent by mass, <i>Max</i>	0.05	—	A-3 of IS 2432

5 PACKING AND MARKING

5.1 Packing

The gas shall be compressed in cylinders. The design of the cylinders, pressure of gas in cylinders, packing, marking, painting, labelling and transport of cylinders shall be in accordance with *Gas Cylinder Rules, 1940*, with such modifications as may be ordered from time to time by the Chief Inspector of Explosives, Government of India or other duly constituted authority.

5.1.1 BIS Certification Marking

The containers may also be marked with the Standard Mark.

5.1.1.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the

licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6 SAMPLING

6.1 The representative samples of the material shall be drawn according to the method prescribed in Annex B of IS 2432.

7 QUALITY OF REAGENTS

Unless specified otherwise, pure chemicals and distilled water (see IS 1070) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis

ANNEX A

[Table 1, Items (i), (ii), (iii), (iv), (v) and (vi)]

TESTS FOR PURITY, NON-VOLATILE RESIDUES, SELENIUM, LEAD, ARSENIC AND HEAVY METALS

A-1 PURITY

A-1.1 Titrimetric Method

An accurately measured volume of the gas shall be absorbed in alkaline solution and determined by iodometric titration.

A-2 NON-VOLATILE RESIDUE

A-2.1 Collect 300 ml of liquid sulphur dioxide in a 500-ml Erlenmeyer flask and stopper the flask lightly with a cotton plug. Evaporate under a well-ventilated hood. When evaporation shall be complete, only a trace of residue shall be observed in the flask.

A-3 DETERMINATION OF SELENIUM

A-3.1 Reagents

A-3.1.1 Selenium Stock Solution

Transfer 120.0 mg of metallic selenium (Se) into a 1 000-ml volumetric flask, add 100 ml of dilute nitric acid (1 in 2), warm gently on a steam bath to effect solution and dilute to volume with water. Transfer 5.0 ml of this solution into a 200-ml volumetric flask, dilute to volume with water, and mix. Each millilitre of this solution contains 3 µg of selenium ion (Se).

A-3.1.2 Standard Selenium Solution

Just prior to use, transfer 20.0 ml of selenium stock solution (60 µg Se) into a 200 mm × 25 mm test tube, add 20 ml of hydrochloric acid, and mix.

A-3.1.3 Sample Solution

Transfer 2.0 ml of the sample to a 250-ml Erlenmeyer flask, and cautiously add 10 ml of 30 percent hydrogen peroxide. After the initial reaction has subsided, add 6 ml of 70 percent perchloric acid, heat slowly until white fumes of perchloric acid are copiously evolved, and continue heating gently for a few minutes to ensure decomposition of any excess peroxide. If the solution is brownish in colour due to undecomposed organic matter, add a small

portion of the peroxide solution and heat again to white perchloric acid fumes, repeating, if necessary, until decomposition of the organic matter shall be complete and a colourless solution is obtained. Cool, add 10 ml of water, and filter into a 200 mm × 25 mm test tube. Wash the filter paper with hot water until the filtrate measures 20 ml, add 20 ml of hydrochloric acid, and mix.

A-3.2 Procedure

Place the test tubes containing the standard selenium solution and the sample solution in a water-bath, and heat until the temperature of the solutions reaches 40°C. To each tube, add 400 mg of ascorbic acid, stir until dissolved, and maintain at 40°C for 30 minutes. Cool the solutions, dilute with water to 50 ml, and mix. Any pink colour produced by the sample solution shall not exceed that produced by the standard solution.

A-4 TEST FOR LEAD

A-4.1 Sample Solution for the Determination of Lead, Arsenic and Heavy Metals

A-4.1.1 Measure out 100 ml of sulphur dioxide (144 g) into a 125-ml Erlenmeyer flask, and determine the weight of sample taken by the loss in weight of the sample bomb. Evaporate to dryness on a steam bath, add 3 ml of nitric acid and 10 ml of water to the dry flask, and warm gently on a hot plate for 15 minutes.

Transfer the contents of the flask to a 100-ml volumetric flask, dilute to volume with water, and mix. Transfer a 10.0-ml aliquot into a second 100-ml volumetric flask, dilute to volume with water, and mix.

NOTE — The tests in which this solution is to be used will be accurate assuming a 144 g sample has been taken, if not, the weight of sample actually taken must be considered in the calculations.

A-4.2 Procedure

A-4.2.1 A 7.0-ml portion of the sample solution (A-4.1) diluted to 40 ml with water meets the requirements of the lead when tested as per 15 of IS 1699 using 10 μ g of lead ion (Pb) in the control.

A-5 TEST FOR ARSENIC

A-5.1 A 7.0-ml portion of the sample solution (A-4.1) diluted to 35 ml with water, meets the

requirements of the arsenic when tested as per 15 of IS 1699.

A-6 TEST FOR HEAVY METALS

A-6.1 A 5.0-ml portion of the sample solution (A-4.1) diluted to 25 ml with water, meets the requirements of the heavy metals when tested as per 16 of IS 1699 using 20 μ g of lead ion (Pb) in the control (Solution A).

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